

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

re Application

PATENT APPLICATIONInventor: Lester D. Nelson; Laurent Denoue;
William N. Schilit; Elizabeth F. ChurchillArt Unit: 2645
Examiner: Lisa Hashem

Appl. No.: 10/024,982

Confirm. No.: 4818

Filed: December 18, 2001

Customer No. 23910

Title: MULTI-CHANNEL QUIET CALLS

DECLARATION OF ELIZABETH F. CHURCHILL

I, Elizabeth F. Churchill, declare that:

1. I am one of the inventors of the above-referenced U.S. Patent application.
2. I have been advised by counsel that all of the pending claims of the patent application have been rejected in part on the basis of U.S. Patent No. 6,850,604 by *Cannell et al.*, filed on May 31, 2001.
3. Attached hereto as Exhibit 1 is a copy of FXPAL (Fuji Xerox Palo Alto Lab) Invention Proposal (FXPAL-IP-01-005) entitled, "Multi-channel Quite Calls, a method and system for interleaving communication amongst multiple voice paths", submitted internally prior to May, 2001.
4. I contributed to the content and experiments of Exhibit 1 while I was an employee at Fuji Xerox Palo Alto Laboratory in Palo Alto, California.
5. The content of Exhibit 1 includes descriptions of reduction to practice of all the subject matter of the invention (Multi-Channel Quite Calls) claimed in patent application number 10/024,982, including the construction and functional illustration of the subject matter serving the intended purpose.

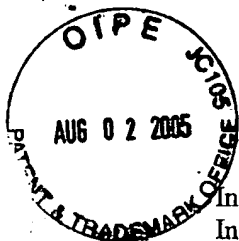
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date:

27 July 2005

By:

Elizabeth F. Churchill



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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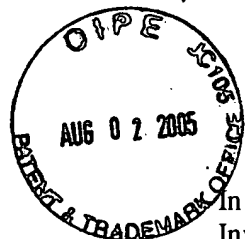
DECLARATION OF LESTER D. NELSON

I, Lester D. Nelson, declare that:

1. I am one of the inventors of the above-referenced U.S. Patent application.
2. I have been advised by counsel that all of the pending claims of the patent application have been rejected in part on the basis of U.S. Patent No. 6,850,604 by *Cannell et al.*, filed on May 31, 2001.
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4. The content of Exhibit 1 was developed and all experiments were conducted while I was an employee at Fuji Xerox Palo Alto Laboratory in Palo Alto, California, as evidenced by my affiliation listed on the front pages of the publication.
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Date: 27 July 2005By: Lester D. Nelson



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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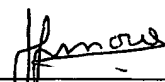
DECLARATION OF LAURENT DENOUE

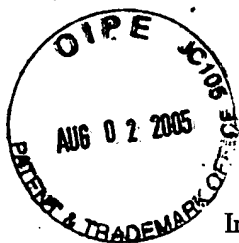
I, Laurent Denoue, declare that:

1. I am one of the inventors of the above-referenced U.S. Patent application.
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4. The content of Exhibit 1 was developed and all experiments were conducted while I was an employee at Fuji Xerox Palo Alto Laboratory in Palo Alto, California, as evidenced by my affiliation listed on the front pages of the publication.
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Date: 07/20/2005

By: 
Laurent Denoue



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application

Inventor: Lester D. Nelson; Laurent Denoue;
William N. Schilit; Elizabeth F. Churchill

Appl. No.: 10/024,982

Confirm. No.: 4818

Filed: December 18, 2001

Title: MULTI-CHANNEL QUIET CALLS

PATENT APPLICATION

Art Unit: 2645

Examiner: Lisa Hashem

Customer No. 23910

DECLARATION OF WILLIAM N. SCHILIT

I, William N. Schilit, declare that:

1. I am one of the inventors of the above-referenced U.S. Patent application.
2. I have been advised by counsel that all of the pending claims of the patent application have been rejected in part on the basis of U.S. Patent No. 6,850,604 by *Cannell et al.*, filed on May 31, 2001.
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Date: 7/21/05

By: William N. Schilit
William N. Schilit

Exhibit 1

FXPAL

Invention Proposal

FXPAL-IP-01-005

To: Xerox Patent Department
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Palo Alto, CA 94304

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Proposal Title

Multi-channel Quiet Calls. a method and system for interleaving communication amongst multiple voice paths.

Brief Description

This invention builds on the concepts of mixed-mode synchronous communications first introduced in Quiet Calls. Quiet Calls allow mobile telephone users to respond to telephone conversation without talking aloud. A person selects what to say from a non-vocal phone interface and the corresponding audio is inserted into the communication voice path. We extend Quiet Calls here by applying the technique over multiple voice paths, instead of a single call. Unlike automated call processing systems that select a voice response prior to an incoming call (even when adapted to caller id), with Multi-channel Quiet Calls the selection of voice phrases occurs synchronously and with one or more possible recipients. The ability to deal concurrently with multiple voice paths has use in a number of situations, including: responses for callers on a call waiting line; responses for callers on hold; selective dispatch over multiple radio channels such as taxicabs, security guards, and other distributed command and control situations. Incoming audio channels may be mixed or kept separate. Outgoing messages may be received in a point-to-point, multi-cast or broadcast manner. Interfaces are described for phrase and recipient selection.

1 **Description of Invention**

2 **Introduction**

3 Quiet Calls allow mobile telephone users to respond to telephone conversation without talking aloud. A
4 person using Quiet Calls selects what to say from a non-vocal phone interface (e.g., tap, press, click). Pre-
5 recorded or synthesized voice for the selection is then silently introduced into the telephone voice path.
6 The method extends to all form of voice communication, including landline telephone, cell phone, Internet
7 phone, videophone, two-way radio, CB radio, intercom, etc.

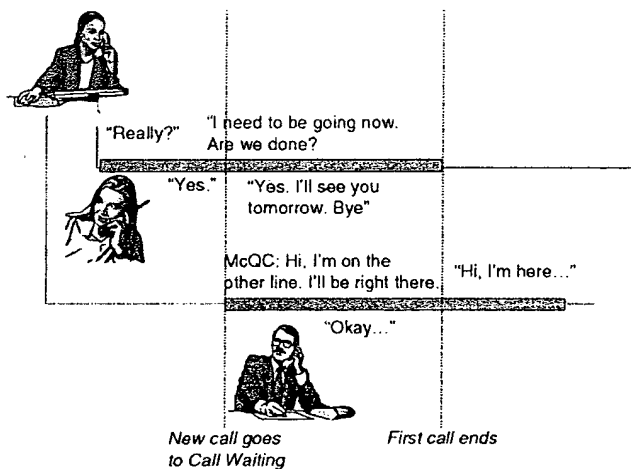
8 The Quiet Calls method was described for communicating across one voice path by using a non-vocal
9 interface.

10 **Motivation and Uses**

11 In Quiet Calls we investigated the need to simultaneously addressing the voice needs of both a phone call
12 and a local situation (e.g., meeting room, waiting area). Features like Quiet Calls and Call Waiting come
13 about due to the need to interact with different people about different things at the same time.

14 Common situations where the need for multiple channels of synchronous audio communication arise
15 include:

- 16 • *Call Waiting*
17 When a call comes in the recipient is given the choice of putting the ongoing conversation on hold
18 and switching to the other line. Typical responses in this situation are "I'm on the other line, can
19 you wait for a minute?" or "I'm on the other line, I'll call you back". For example, the following
20 figure shows one of the many possible conversations that may be conducted in this way.



21 **Timeline of Multi-Channel Conversation over Call Waiting**

1 • *Call Hold*

2 When numerous communications (e.g., calls, face-to-face conversations) are arriving at one place
3 (e.g., a reception desk), all but one channel is quickly placed on hold (e.g., "Xerox Lobby. Can
4 you hold?"). A receptionist on the phone may visually signal arriving persons that they will be
5 attending to in a moment.

6 • *Voice Dispatching*

7 In voice dispatching (e.g., taxicab) assignment, a large amount of information is quickly broadcast
8 to a number of recipients. Typically, all communications are preceded by an identifying call
9 handle (e.g., "Car 54") and a brief message that requires acknowledgement (e.g., "Car 54. Roger
10 that.").

11 • *Human Oversight of Automated Media Systems*

12 User who wander alone through an online system such as voice response system (e.g., banking or
13 reservations systems) can sometimes become lost or frustrated. A system might allow users to
14 stay on the line for the next operator. Alternatively, a Multi-Channel Quiet Calls approach would
15 be to allow a human operator to oversee (e.g., listen in, follow along a graphical representation of
16 the user's navigation) to many channels at once. When one channel appears to be going astray
17 (e.g., suspicious restarts of the voice response systems, verbal cries for help), the operator could
18 direct verbal assistance into the line through Multi-Channel Quiet Calls or engage the line
19 verbally if necessary. A similar arrangement could be made for online tutorial systems.

20 As we investigated Quiet Calls, the possibility of applying this non-vocal conversation technique to handle
21 other simultaneous communication demands presented itself. Just as the receptionist may hold up an
22 index finger to indicated attention is to be expected 'in one moment', a Quiet Calls response could be
23 delivered on one line, while conversing on another.

24 **Multi-channel Quiet Call Capabilities**

25 The Multi-channel Quiet Call approach for a public conversational technology as detailed in this proposal
26 has the following features applicable for both placing and receiving calls:

27 • *Conversational phrases are directed to one or more communicating parties.*

28 Non-audible input operations (pressing a key or button, touching a display) are translated into
29 appropriate audio conversation signals on the one or more selected channels. The user specifies
30 the phrase and the channel for that phrase.

31 • *One conversation may be conducted audibly.*

32 Only the participants in multiple-contact situations need change their communication mode. Other
33 callers participate as in any phone call.

34 • *The user may listen to one channel at a time or may mix the audio from several channels.*

35 In many person-to-person phone calls, a caller must pay strict attention to one channel of
36 information. There are other circumstances where it may be possible to mix the incoming audio
37 from multiple channels of information. For example, if the caller is on hold waiting for a service
38 call, it may be possible to converse with another party. When a service representative all of a

sudden takes the call, the conversational needs quickly change. A Quiet Calls approach addresses the simultaneous conversation needs by directing a phrase at the service representative that s/he will get immediate attention and directing a phrase at the third party that the conversation needs to be concluded.

- *The conversation permitted is expressive*

Users of Quiet Calls identified a number of useful phrases relating to future contact, redirecting calls, and simple responses. Conversation representations may be predefined, recorded as needed, or synthetically generated on demand (e.g., text-to-speech).

Making future contact	Directing call elsewhere	Responding simply
I'll get back to you later.	Send me an email	Yes
We'll talk when I get back to the office.	Leave a message and I'll get back to you.	No
I'll call you later	Please leave a message	Maybe
Give me 5 minutes, I'll call you back	Leave a voice message, at home or at work.	I agree
Is there anything else you need to say	Fax it to me	I disagree
Some acknowledgement like "I heard what you said"	Can you call me later	Say that again
I'll call you back as soon as I'm free	Direct caller elsewhere	Now's not a good time to talk
I'll call you back in 5 minutes or 10 minutes	Be more explicit about going someplace where he can talk	I'm tied up right now.
Please hold, I'll be with you in a minute	I'm walking out now	Okay, bye

- *The communication interface is easy to use when a user is engaged in other activities.*

The interface represents available conversation utterances so that they may be easy to recognize (e.g., icon, text label) and invoke (e.g., point and click). One input selection (e.g., button press) may invoke a possibly complex sequence of responses supporting the dialogue (e.g., putting a person politely on hold or terminating the conversation).

- 1 • *Audio hardware may be activated at any point in the voice call path*
- 2 Phrases may be stored or played back in the handset, as an accessory, in the call channel, or in a
- 3 shared processor available to multiple call channels
- 4 • *Audio hardware on one channel may be activated and even if the caller is actively engaged on*
- 5 *another*
- 6 Phrase selections may be communicated to audio hardware on one channel either by messaging,
- 7 (e.g., over computer network) or by temporary connection to a channel (e.g., hook-switch,
- 8 selection delivery such as touchtone commands, and return to the original channel).
- 9

Technical Details

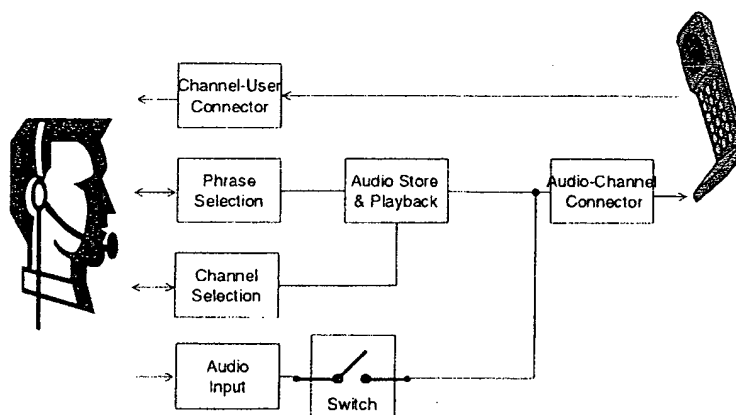
A multi-channel quiet call conversation as described here is a electronically assisted discussion (e.g., a phone call) being held between two or more parties that has the following attributes:

- The conversation is being expressed at least in part vocally (e.g., via telephone, cell phone, Internet phone, videophone, two-way radio, intercom, etc.).
- One or more parties in the conversation are located in a situation where multiple people must be engaged (e.g., call hold, call waiting, message dispatch, etc.).
- Consequently, one or more parties in the discussion uses an alternative, non-vocal mode of discussion (e.g., keyboard, buttons, touchscreen, etc.) for the audible content of the discussion that is transformed into an equivalent audible electronic representation on selected audio channels.

An architecture for multi-channel quiet-mode conversation consists of the components shown in the following figures. Two modes of operation are defined: conducting and preparing a call.

Conducting a Multi-Channel Quiet Call.

In this mode, a user conducts a voice conversation while at the same time engaging audibly on another channel with no audible feedback into other channels. The capabilities required for supporting this mode of communication are shown in the following architecture:

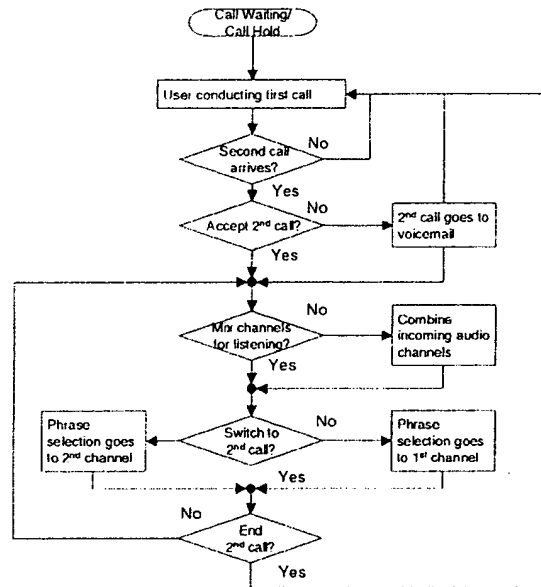


System Mode: Conducting a Conversation

A user views a Conversation Representation and makes phrase selections about utterances to be voiced over the communication channel. When selected, phrases are retrieved and audible output signals are produced for the communication line. An Audio to Channel Connector provides this electrical connection. A Channel to User Connector allows the user to hear both the conversation generated by the system and

1 other callers. A switchable Audio Input (e.g., microphone) allows the user to voice directly into the
 2 channel when appropriate.

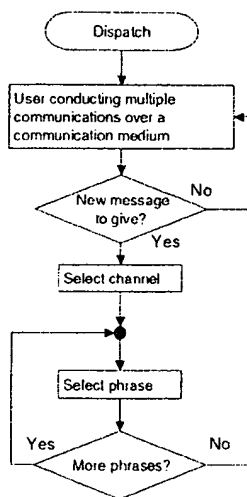
3 A user is given a choice of what channels receive the selected phrases. The following figures describe the
 4 channel selection for the Call Waiting, Call Hold, and Dispatch situations highlighted above. The channel
 5 selection is accomplished by accepting the user's channel choices, including menu selection, handset
 6 switches or buttons, and other selection means known in the art.



7

8 **Method for Multi-channel phrase and channel selection for Call Waiting and Call Hold**

9 **situations**



Method for Multi-channel phrase and channel selection for Dispatch situations

Preparing Quiet Call Conversation Structures.

In this mode the user prepares for a non-vocal conversation by adding, deleting, or modifying conversation structures (representations and data storage) and channel selections held within the system. Preparing for phrase selection is very much as described in the Quiet Calls system. Updating the channel selection is accomplished by presenting the user with channel selection choices, including menus, handset switches or buttons, and other user interface means known in the art.

Multi-channel Quiet Calls Embodiments

In a multi-channel quiet mode conversation, all sides of the conversation use a common communication mechanism (e.g., telephone infrastructure). But the person with the need to converse with several others simultaneously would have a special interface for responding to these other conversation.

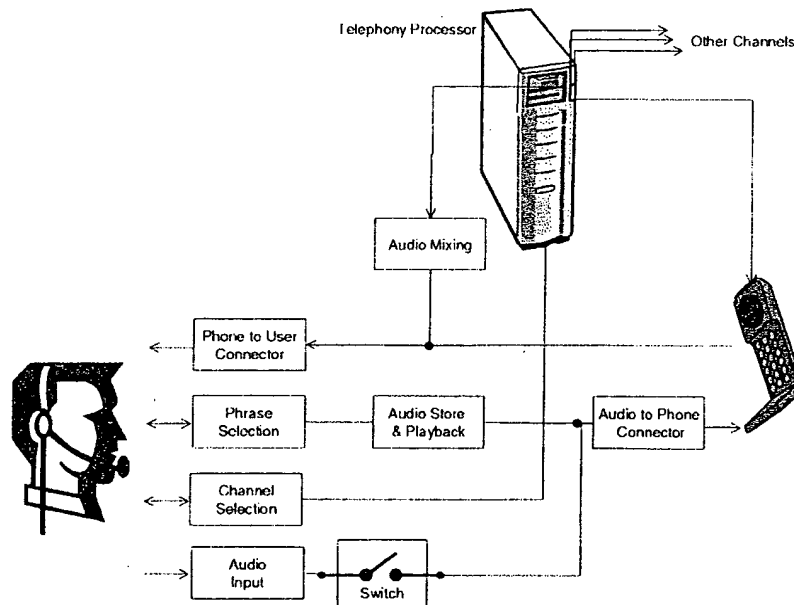
Three basic arrangements of this principle are described here:

- (1) Separate channel selection. Each party-party communication may occur on a different communication channel (e.g., telephone voice paths, different radio frequency). In this case, dealing with these calls at the same time while only being able to access one at a time requires that the user switch between channels. The user responds to each individually and moves between them (e.g., call waiting/call hold situations described above). The user selects which channel to attend to and then selects which phrase to apply on that channel. The audio generating hardware must be accessible to that channel (e.g., in the handset, as an accessory attached to the handset, or linked into the communication hardware for the voice path).

One variation on this notion allows the user to stay in direct audible contact with one channel and trigger phrases in the other. This may be accomplished by either

- (a) momentarily switching channels, issuing the phrase selection command to that channel's hardware, and switching back to the first channel;
- (b) dispatching phrase selection commands to another channel by some other connection (e.g., over a computer network to the corresponding control processors).

(2) Mixed channel selection. In this arrangement, the audio input to the Multi-channel Quiet Calls user is the product of mixing several audio streams for different channels. The audio output is kept separate for each active channel and the user may reply on other channels in the same way as with separate channel selection, above. Where the communication infrastructure does not directly support such audio mixing, a bridging approach may be implemented, as shown in the following figure. A telephony processor connects (e.g., conference call) to all open channels. Channel selection is made through commands sent to the telephony processor (e.g., switch channels, mix audio channels, answer, hang-up) via a separate data network. The telephony processor mixes the selected channels and streams the audio only to the Multi-channel Quiet Calls user (e.g., direct electrical connection to the user's earpiece).



Bridge configuration for mixing audio channels to the user

- (3) Broadcast selection. Some communication means use a single broadcast medium (e.g., radio broadcast for dispatchers). Typically, each communication is identified by source of message,

- 1 destination, and message content. Channel selection in this case amounts to having the Multi-
- 2 Channel Quiet Calls system generate the audio preamble (source and destination identifiers)
- 3 based on user selection (e.g., as defaults or explicit selection).

1 **Novelty**

2 No other system is known that has been designed for conducting an expressive conversation non-vocally in
3 a multi-channel environment. A number of systems contain elements similar to those described in parts of
4 this proposal. These are described below.

5 Novel features of Multi-channel Quiet Calls that enable parts of conversations to be held across multiple
6 communication channels include the following:

- 7 • Conversational phrases are directed to one or more communicating parties.
- 8 • One conversation may be conducted audibly.
- 9 • The user may listen to one channel at a time or may mix the audio from several channels.
- 10 • The conversation permitted is expressive
- 11 • The communication interface is easy to use when a user is engaged in other activities.
- 12 • Audio hardware may be activated at any point in the voice call path
- 13 • Audio hardware on one channel may be activated and even if the caller is actively engaged on
14 another

15

1 **Summary of Related Work**

2 This invention builds on the previous Quiet Calls invention, filed 13 September 2000. Multi-channel quiet
3 calls adds the ability to select from among different channels, re-direct voice phrases to those channels,
4 and choose to mix or keep audio separate between the channels.

5 The closest system we have found to Multi-channel Quiet Calls is the system currently in use for directory
6 assistance. An operator gets the city and name from a caller seeking a number. The operator looks up the
7 response and then queues a text-to-speech answer and departs the conversation, presumably moving on to
8 another call. This systems does allow communication on two channels, but not in a bi-directional,
9 synchronous way. When the operator queues the message, the call terminates for the operator.

10 Other audio generation techniques include the following.

11 **Phone-Audio Interaction**

12 The following two systems provide for interactive phone and recorded audio use. These do not give the
13 cell phone user a quiet conversational capability, but they do support similar arrangements of hardware
14 that is required for Quiet Calls.

15 U.S. Patent Number 5790957 from in cellular telephone. An apparatus permits storage of a message
16 originating locally from a user of a cellular telephone, inputted via a phone's microphone, or from a
17 another caller through the phone's receiving channel. Subsequent playback to a speaker of the telephone to
18 be heard by a user of the telephone or to the distant telephone. This enables the telephone to provide
19 features of prompt, voice pad, transcription, and voice mail.

20 A sound effects device is available from www.shopvoyager.com (Phone-Fun Special Effects Machine,
21 #TE2200) that plugs into a wired phone or answering machine and generates 10 sound effects (doorbell,
22 street noise, etc.) into the phone. The sound effects are fixed at time of manufacture, except a voice
23 altering circuit is included to disguise one's voice.

24 **Text to Speech Synthesis**

25 Text to Speech (TtS) conversion vocalizes typed text with a synthetically generated voice. TtS toolkits are
26 available from many sources, including but not limited to the references given below. Applications of TtS
27 include: vocalized email and other documents, files, or database entries; conversational character speech
28 generation (i.e., interactive conversation with a synthetic speaker or other software program); multilingual
29 translation (i.e., type in one language, voice in another); and voicing typed in phrases for people with
30 disabilities.

31 TalkToMe! is a communications tool for people who can no longer speak (e.g., as a result of
32 neurodegenerative diseases). It uses Apple's Text-To-Speech capability to simulate speech, and allows you
33 to store common words and phrases for two-click speaking (one click to select the phrase, one click to
34 speak it). You can type the text into the text field, paste it in, or use an on-screen keypad to "click" it in.
35 Once entered, you can "speak" the text by hitting return or clicking the Speak button. If you would like to
36 save the phrase, you may store it in any of your user-defined categories. TalkToMe! comes with 6
37 categories, which may be modified to suit individual tastes. They are: Bible Verses, Common Words,
38 Jokes, Poems, Prayers, and Sayings. Additional categories may be added up to the limit of 100.

1 Devices have been created for add-on speech synthesis capability. For example, MultiVoice is a
2 lightweight and portable speech synthesizer with text-to-speech capabilities that connects to a computer
3 RS-232 serial interface.

4 A number of speech to text software toolkits for PC's and other computers are available (See References).

5 Text to Speech conversion is one possible background technology for mixed-mode conversation as
6 described in this Invention Proposal, and, in particular, for the Audio Generator capability. TtS by itself
7 requires significant typing for the user and hence may not be appropriate for many public usages (e.g.,
8 typing noise and level of effort required for typing-only solutions). TtS provides only a synthetic voice that
9 is recognizably artificial and does not sound like the intended recipient of the call. In the PC embodiment
10 described previously, the TtS capability is a back up capability for handling conversational situations that
11 are the exception rather than the norm. Predefined versions of conversational templates are not stored.

12 Other Multimodal Speech Synthesis

13 Most of these systems compensate for loss of various sensory abilities by converting between vocal speech
14 and other modes of communication. These systems are designed for a cross modal transformation of input
15 to support an ongoing dialogue. However, they do not do so in a manner easy and appropriate for users
16 with fully able hearing.

System	Description
Minspeak	Semantic Compaction (Minspeak) uses pictures (icons) to express conversaton using a small set of symbol. It does this by assigning more than one meaning to each icon and then sequencing them together to produce those different meanings. Each icon has a primary (picture producer) meaning and several secondary meanings. A number of Minspeak keyboards have been developed for people with speech disabilities. Synthetic voices are used based on Text to Speech technology (above).
Visual/tactile speech generation	Braille cell displays are connected to a PC port and the text string is converted to grade level 1 braille. Six solenoids which raise braille pins. Teleface. A telephone communication aid for the hard of hearing generates a synthetic face that articulates in synchrony with the telephone speech. Note these systems silently deliver speech, but there is no mechanism to silently reply.

17 Intermodal translation concepts expressed in different modalities & translate between them (e.g., synthetic
18 speech, Braille display, writing to sign language, sound / text information to spatial, non-verbal expression
19 of questions, requests

FEATURES	Quiet Call	Nokia speech recall	Sound Effects	TtS	Minspeak	Virtual Assistants	Multimodal Interaction
Supports quiet conversation for callers in public	√	Only single prompt scenario supported	No	√ TalkToMe	√ TalkToMe	No	No
Permits audible conversation for other callers	√	√	No	√ TalkToMe	√ TalkToMe	No	No
The communication interface is easy to use when a user is engaged in other activities	√		√	No	No, requires training	√	√
The communication interface is situation-appropriate	√	Only for single prompt scenario	√	Only PC supported	√	√	No
The system works with the existing communication infrastructure	√	√	√	√ TalkToMe	√	√	No
The conversation permitted is expressive	√	No	No	√ TalkToMe	√ TalkToMe	No	No

1

2 Status

3 The bridge configuration embodiment uses much of the same technology as the Telephony Processor-based Quiet Calls prototype described in patent filing FXPAL-IP-00-005E. There is still a need to conduct
4 user-centered design for creating specific interfaces for the scenarios described here.
5

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1 **Papers**

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3 for communicatively disabled individuals. Byte, 7, 186-202.
- 4 Baker, B. (1986). Using images to generate speech. Byte, 11, 160-168.
- 5 Bruno, J. (1989). Customizing a Minspeak system for a preliterate child: A case example. Augmentative
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- 7 Cohen, P. R., The role of natural language in a multimodal interface, Proceedings of the fifth annual ACM
8 symposium on User interface software and technology, 1992, Pages 143 - 149.
- 9 Deegan, S. (1993, June). Minspeak: A powerful encoding technique. Communicating Together, 11(2), 22-
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- 11 Thórisson, K. R., Gandalf: an embodied humanoid capable of real-time multimodal dialogue with people,
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13 conference on Autonomous agents. 1997. Pages 536 - 537.

14 ***Others known to have worked on this or a similar invention***

- 15 See related work given in the Novelty section above and Appendix A.

16 ***Related invention proposals, patents, publications or commercial work***

Relevance to Quiet Call	US Patent number	Title
High	4241521	Multi-symbol message communicator for a speechless, handicapped person
High	5790957	Speech recall in cellular telephone
Med	4661916	System for method for producing synthetic plural word messages
Med	5210689	System and method for automatically selecting among a plurality of input modes
Med	5297041	Predictive scanning input system for rapid selection of auditory and visual indicators
Med	5920303	Dynamic keyboard and method for dynamically redefining keys on a keyboard
Low	4515995	Telephone answering machine with apparatus for selecting particular outgoing message in response to incoming call on a particular line
Low	4517410	Automatic user selected variable telephone message record and playback system
Low	4591664	Multichannel interactive telephone answering apparatus
Low	4663777	Apparatus for controlling digital voice recording and playback over telephone lines and adapted for use with standard host computers

Relevance to Quiet Call	US Patent number	Title
Low	4715060	Door message apparatus with telephone answering device
Low	4985913	Multiple message answering machine keyed to the incoming phone number
Low	5029214	Electronic speech control apparatus and methods
Low	5259024	Telephone answering service with integrated voice and textual message storage
Low	5668868	Memorandum recorder for use with a telephone
Low	5822403	Automated telephone hold device
Low	5991374	Programmable messaging system for controlling playback of messages on remote music on-hold- compatible telephone systems and other message output devices

1 **Has invention been built, made, run, or tested?**

2 The bridge configuration embodiment uses much of the same technology as the Telephony Processor-
3 based Quiet Calls prototype described in patent filing FXPAL-IP-00-005E.

4 ***Is the invention used in a current product(s) or planned for use in a future***
5 ***product(s)?***

6 We are currently pursuing productization of Quiet Calls (e.g., licensing in different telecommunication
7 market segments). The product concept for Multi-channel Quiet Call is currently being investigated. This
8 invention represents more intellectual property in that patent portfolio.

9 ***Dates of any previous or planned future disclosures external to Xerox***

10 A submission for CHI2002 is currently planned with a paper submission date in September 2001.

11 ***Source of outside funding***

12 None.